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STATEMENTS

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RESPECTING

THE PROFITS OF MINING
IN ENGLAND

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CONSIDERED IN RELATION TO
THE PROSPECTS OF MINING
IN MEXICO.

IN A LETTER TO
THOMAS FOWELL BUXTON, Esq. M.P.

BY
JOHN TAYLOR.

LONDON:

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1825.

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TO

T. F. BUXTON, Esq. M.P.

Chatham Place,
London, 28th Nov. 1825.

DEAR SIR,

THE extraordinary revolution in public opinion, with respect to Mining speculations, which we have witnessed in the course of a few months, presents a remarkable instance of ill-advised confidence and temerity having been followed by excessive alarm and doubt, while in reality neither the one nor the other, except in a very few cases, has been at all founded upon a knowledge of the subject. Shares in undertakings of this description have been sought after with the utmost eagerness, and at prices the most extravagant, without much inquiry into the merits of the enterprise, and this has been followed by an ignorant or unjust denunciation of the whole.

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I, as you well know, never adopted the extravagant expectations which once prevailed, neither can I reconcile myself to the over anxious depression which now exists. I believe that reason will be found to lie between the two extremes of indiscriminating confidence and despair. I think it not improper, therefore, to explain to you my views on a question which it is important should be rightly understood, and which may be discussed at the present period without danger. I shall avail myself of certain facts and illustrations, derived from transactions which concern individuals and may be considered as private, yet I conceive the use of them to be warranted by the occasion, and the interest now taken by the public in the question to which they relate. It is my desire only to convey information, and to suggest the mode in which such matters may be considered; this may conduce to quiet the present feeling of dismay, which I should willingly endeavour to do, although I would have avoided publishing any thing in another state of public opinion, lest it might have

tended to abet that rage for mining speculation which was then at its height.

I intend to examine the question so often proposed, whether mining is on the whole profitable or not; and further, whether, if profitable in this country, there is a reasonable expectation of its being sufficiently so in Mexico, for instance, to justify the investments of such portions of capital as must be required to be appropriated to it.

The conclusion which I shall endeavour to prove is, that mining is profitable, and sufficiently so to cover the risk with which it is and always must be attended, provided two conditions are attended to, which are that due care and skill is observed in the selection of mines to be worked, and that in working them the necessary experience, caution, and integrity are employed in the management. This conclusion I shall attempt to draw from the facts and experience which an intimate acquaintance and connexion with mines in England for many years have furnished, and I shall add some of the reasons why, in my opinion, there is just ground to expect favourable results, in applying capital to the

mines of Mexico, under the same conditions of judicious selection and well-directed management.

I am not afraid in making this attempt of having improper motives imputed to me by those who know me, and who are acquainted with the part I have taken in transactions of this nature. I can appeal to you, and many others, to prove that I have had no participation in the traffic in shares; you know that my interest consists in the welfare of the concerns in which I am engaged, and is not likely to be concerned in any high or low price which shares may bear in the market; that I have always refused to accept a larger portion than I thought I could afford to provide capital for, and you have the means of knowing from many of those respectable individuals who are associated with us in the Real del Monte Company, and who have watched my conduct in the management of mines in which they have been engaged with me for a long series of years, that my practice in this respect has been uniform, and that I should always have thought the value of my opinion reduced and degraded, if it had been

influenced by the hopes and fears of a speculator.

I have laboured long in the pursuit of mining, and I am most ready to avow that I ought to be regarded as an ardent partizan; that I have all my life been prompted by an earnest desire for the improvement of this branch of industry, and have been stimulated by that measure of success which is indeed essential to a continued direction of effort; nevertheless, if I proceed now upon a recital of facts, and deduce from them temperate and fair conclusions, they will not, I trust, be invalidated by coming from one who may be somewhat ardent in the support of undertakings respecting which there is so little known, and so much error and misconception appears to prevail.

You, and several of those gentlemen who are the principal Shareholders in the Real del Monte Company, being also engaged with me in a number of mines in England and Wales, know that some of these mines have been worked thus for many years, and that the greater number have been added within the last few years by the increased capital

applied to the purpose, which the success of some of these concerns encouraged, and which the facility of obtaining money for such investments rendered easy.

I have now just completed one of my journies of inspection of these mines, and propose to state the result of a careful examination into the present condition of the whole. No just conclusion can be come at in a subject of this sort, but on a large average; mines are so different in all circumstances,—some producing large profit where little or no capital has been employed, and others terminating only in loss, even where great expenditure has been made under the best consideration of skilful and experienced men, while others again present every intermediate shade,—that I conceive it necessary to show that the mines from which I would calculate are both numerous and important. And as I, and those who have entrusted their capital to my disposal, have always considered the risk and uncertainty as diminished by dividing our capital over a number of such concerns, selecting, as I have said, with the best care we could, it remains for me to

show what has been the result, taking the mines as they stand at this time.

These concerns are situated in different parts of Cornwall, Devon, and North Wales; they are now to be considered as thirty-nine mines, though including what were formerly reckoned at a far greater number, many having been consolidated or added together, so as to form one undertaking. Each mine has its separate Company of Adventurers, and the number of shares in each is not in any case more than one hundred and twelve nor less than sixty-four. The interest in each mine is generally different in each individual, and some have shares in one and not in another, so that the profit or loss, on the whole, will not apply to the case of any one partner, but as the whole are much in the hands of the same proprietors, they may be considered as belonging to the same set of persons, forming a number of companies, each having such a share in such of the mines as circumstances dictated.

Many of such proprietors may have purchased into the concerns at considerable premiums, and therefore the capital which I

calculate on may be much less than would be made out by adding such premiums to it, but as this has nothing to do with the capital really invested, and consequently with the profit the mines give on money really employed, I only notice it to guard against error, and to state that I put down that only as capital, which has been paid by original Adventurers.

In some of these mines I have been interested as manager and partner for more than twenty-six years, others in that time have been worked, some with profit and others with loss, and are now abandoned; the greater number have, however, been undertaken within the last ten years, some being old mines re-opened, some newly discovered, and some purchased or taken after being abandoned by others.

I shall divide the whole into four Classes.

1st Class.—Thirteen profitable mines in full work, and which at present are likely to continue their produce.

2d Class.—Eleven mines, on which a large capital has been also expended, which are in a state of progress, and which are likely

soon to become profitable, though the returns do not yet balance the expenditure.

3d Class.—Seven new mines with promising appearances, with the usual risk, however, of failure, and requiring yet additional capital.

4th Class.—Eight mines which are declining, or the prospect is unfavourable, which are working at a loss, and which, if no alteration for the better appears from trials that are now making, will be abandoned in no very long time.

The particulars necessary to be stated of these mines are as follow :—

1st Class.—Thirteen Mines, producing the following annual results, calculating on the present monthly returns.

Capital employed, £249,320.

	Tons.
Annual produce, Copper Ore	45,720
Tin Ore	504
Lead Ore	5,640
	<hr/>
	51,864

Value of the Ores after payment of

Lord's dues	462,600
Cost of working the mines	327,000
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Profit	£135,600

(Employing thirty-three steam-engines and water-wheels for pumping.)

2d Class.—Eleven Mines.

Capital employed, £193,000.

	Tons.
Annual Produce, Copper Ore	1644
Tin Ore	360
Lead Ore	2040
Cobalt Ore	24
	<hr/>
	4,068
Value	63,000
Cost of working	99,000
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Loss	£36,000

(Fifteen steam and other engines for pumping.)

I do not calculate, however, that this loss will continue for more than six months longer.

3d Class.—Seven new Mines.

Capital already employed, £13,000.

No Produce.

Cost to continue the proper trials for
twelve months . . . £21,600

(Four steam-engines for pumping.)

4th Class.—Eight Mines, on which loss
may be made, if discoveries do not shortly
take place.

Capital employed, £98,400.

	Tons.
Annual produce, Copper Ore	3240
Value	25,800
Cost of working	43,560

Annual loss, if continued £17,760

(Twelve steam and other engines for pumping.)

The whole Capital now employed
will appear to be . . . 249,320
193,000
13,000
98,400

553,720

	553,720
To which I would add for Class 2, six months cost	18,000
Class 3	21,600
	<hr/>
	593,320
Deduct for capital to be received by sale of engines and various stock of Class 4, as the mines are stopt,	25,320
	<hr/>
Total Capital will hereafter be	<u><u>£568,000</u></u>

Result as to the mines in full operation.

The present amount of profit in Class 1 is	135,600
The annual loss of Class 4 is	17,760
	<hr/>
	117,840

It is clear that the loss of £17,760 may be made to cease at any moment, by the abandonment of these mines; but in order to avoid any thing of a flattering estimate, let us suppose this loss to continue by the mines being worked for some time longer.

The present rate of profit may increase or decrease. Again, let us take the most unfavourable supposition, and presume that there will be a diminution to the extent of

17,840

The Balance of Profit will be £100,000

The Capital embarked in Class 1 is	249,320
Do. do. Class 4	98,400
	<hr/>
	£347,720

The amount, therefore, as to mines in full operation stands thus :

Capital £347,720. Profit £100,000.
Rate of Interest $28\frac{3}{4}$ per cent.

The mines in Class 4 may probably be discontinued working in the course of six months, and the loss on them be thus prevented; but as in the course of that time a greater diminution in the profit of Class 1 may take place than we have already allowed for, we will continue the deduction of the amount of the loss on Class 4, as a further set-off against such a reduction, and take the balance of profit on Class 1, as before, at £100,000.

There will then be a reduction in the amount of Capital also of £25,320, by the sale of the engines and stock of Class 4, when the account will stand as follows :

Capital £322,400. Profit £100,000.
Rate of Interest 31 per cent.

Hitherto we have only considered the mines in full operation. We are next to turn our attention to those which are in a state of progress, *viz.*

Class 2, which are approaching to maturity.

Class 3, which are yet in their infancy.

The Capital embarked is

			£
Class 2,	.	.	193,000
Class 3,	.	.	13,000
			<hr/>
			206,000
Further Capital to be sunk in Class 2			18,000
Do.	do.	Class 3	21,600
			<hr/>
			£245,600

As to the rate of profit on these investments, it is evident we can arrive at nothing more than an approximation to the truth. I see no reason to apprehend that these will produce a less proportionate return than the mines in Class 1 and 4; but granting they may be less profitable by two parts out of five, they will still realize a profit considerably above £40,000 per annum, which, added to the £100,000 profit on Class 1 and 4, will

make an average profit on the whole of 24 per cent ; as per following statement.

Balance of profit of Class 1	100,000
Estimated profit on Class 2 and 3	40,000
	<hr/>
	£140,000

Capital on Class 1 and 4, after deducting the produce of Stock, &c.	
on Class 4	322,400
Capital on Class 2 and 3	245,600
	<hr/>
	£568,000

Capital £568,000. Profit £140,000.

Rate of Interest 24 per cent.

The result is this : he who looks at the present produce of the mines only which are in actual operation, sees a profit of 31 per cent. on the capital.

He who chooses to speculate on the produce of mines still in progress, in addition to those in full operation, may, it appears, calculate on an average profit of 24 per cent. on the whole capital embarked.

And he who, still more timid, calculates that the loss on Class 4 will continue, and that no further gain will take place on Class 2 and 3, when they are brought to ma-

turity, may thus compute the whole investment of capital:

Balance of Profit on Class 1, after making the full allowance for the diminution that may take place as before mentioned	100,000
Deduct for Annual Loss on Class 4, supposing those mines to continue in work	17,760
	<u>£82,240</u>
Capital embarked in Class 1	249,320
Do. do. Class 2	193,000
Do. to be added to complete the work	18,000
	<u>211,000</u>
Do. embarked in Class 3	13,000
Do. to be added to complete the work	21,600
	<u>34,600</u>
Do. embarked in Class 4	98,400
	<u>593,320</u>

Capital £593,320. Profit £82,240.

Rate of Interest about 14 per cent.

This is the clear income which any one, having the same share in the whole, would receive his proportion of, after allowing for payments to unprofitable concerns, and which income, as I have before stated, may probably advance to £140,000.

My expectations, as to this increase of income, will not appear very unreasonable,

when it is apparent that, by putting a stop to the investment and the loss at once, the profit of £135,600 would remain. This would, however, be an act of folly, as profit is likely to arise from the one, and the losing mines will, of course, only be continued until all reasonable prospect of improvement is over.

I subjoin the following particulars, though not essential to the argument.

Total produce of the Mines.

	Copper Ore. Tons.	Tin Ore. Tons.	Lead Ore. Tons.	Cobalt. Tons.	Nett Value. £
Class 1,	45,720	504	5,640		462,600
2,	1,644	360	2,040	24	63,000
4,	3,240				25,000
	<hr/>	<hr/>	<hr/>	<hr/>	
	50,604	864	7,680	24	<hr/>
Value to Adventurers after payment of dues					£550,600

Engines employed for draining all the Mines.—

Forty-three steam-engines, from 30-inch pistons to 90-inch.

Twenty overshot water-wheels, from 36 feet diameter to 50 feet.

The number of persons employed I cannot very exactly estimate, but believe them to be from eight to ten thousand.

These statements, if you think them illustrative of the question, I shall be glad to prove to you are substantially correct, by referring you to the accounts where the detail is exhibited, and to persons whom you know that have the charge of them. That considerable profits are regularly divided I believe is a fact within your own knowledge; I have taken some pains to examine and arrange the account which I now submit to you, and I am not aware of any part in which I may have been liable to error.

Whether the statement may be sufficiently extensive in the number of mines, quantity and value of produce, and duration of time, to satisfy the inquirer I do not know; but as to the number, I would remark that I only endeavour to show that mines well-selected are on the whole profitable, admitting that with the utmost care and diligence some losing ones will have place with the better ones. It has often been said, indeed, that mining, on the whole, is not profitable; I do not from my own observation believe this assertion, which perhaps has generally been made at a guess by persons little acquainted with the

subject; but even if it were true, it would only show that there is a great deal of imprudence in selection and bad management, which ought hardly to be charged to the account; and when it is considered how mines are often undertaken by persons unqualified to form a correct judgement, and impelled by delusive hopes, it is not very wonderful that cases of serious disappointment occur to the discredit of the whole.

As to the quantity and value of the produce of the mines which I adduce as examples, I shall only remark, that they include such as are at present yielding nearly one-half of the copper produced in Great Britain, besides some considerable portion of lead and tin.

The duration of mines is another very interesting question, and, generally speaking, they ought prudently to be looked at as comparatively short-lived, or subject at least to failure and exhaustion. Much, however, depends on management and foresight; very great improvement has been made even in later years in this part of the economy of mining. The appropriation, or investment of part of the profits in opening new mines is of itself one

mode of supporting the profitable state of the whole ; but even without this an analogous process is going on continually in every well-managed mine ; part of the proceeds are constantly employed in exploring the ground, in searching for new discoveries before former ones are exhausted, prudent reserves of ore and money are made to provide for unforeseen want, or unexpected failures ; under such a system it is easy to see that mines, where the veins are tolerably productive, may be maintained in a profitable state for years, while, under a more inconsiderate direction, a sudden difficulty, or a temporary poverty, may ruin the concern. That this has often been the case is very notorious, and is one of the reasons why mines suddenly abandoned have so frequently been renewed after some interval with profit.

That accounts might be given by other persons with results as favourable, I have not the least doubt, though perhaps not on so large a scale of expenditure, and some instances exist within my knowledge, where with a comparatively small capital very large profits are making ; but as these would not exhibit the

average produce, but are rather of the nature of capital prizes in the lottery, they would not be so appropriate to our purpose, though they might show a better judgement or more good fortune in the selection. To set against these there are, I am well aware, many ill-advised undertakings, where nothing but loss has been incurred, but where this has been the case they have been commenced and continued against the opinion of those who were most likely to know best the merits of the enterprise. An adventure in any single mine is with the best advice a matter of much risk, and the failure in the hands of experienced men gives occasion of triumph to pretenders, who assume at once that all is chance, or that one is as likely to be right as another; this, however, is not true, and though some degree of uncertainty does really prevail, it may be mitigated by caution, and compensated by combining well-directed efforts.

Without entering into the great question of the propriety of joint-stock companies, I may observe that it seems impossible for mining to be carried to great extent without a division of the risk and a contribution of capital from

a competent number of subscribers. An individual may and often has worked a mine under fortunate circumstances with great success ; sometimes this success is so soon attained that the capital is created and not contributed, but this again is a case of rare occurrence, and not to be reckoned on by prudent men.

The account which I produce shows a capital which it would have been most imprudent, if not impossible, to raise by a very small number of individuals ; and the risk, if undertaken at one period, would have been enormous. Capital advanced for mining should be such as can conveniently be spared without injury to the proprietor, as it may be lost ; it should also be such as can be afforded for a time without the necessity of speedy profit, as the time for returns is uncertain ; and it should not be exactly limited in amount, because a mine may be ruined after much expense for the want of some further outlay than was at first contemplated.

A division of the necessary advances among a number of capitalists renders all these requisites easy, by diminishing that pressure

which would bear hard on individuals where the number was small. It is probable also that the extension of the number of shares beyond a reasonable limit is injurious, first, by tempting persons of small property to embark in speculations where the price of the ticket is low, by engendering a traffic in shares fluctuating in value by varying probabilities of success or the more uncertain undulations of public opinion, and by introducing the weakness incident to companies where the interest is too much divided to present the necessary control over the persons who conduct its affairs.

If the concerns which I have quoted had been equally divided (which, however, as I have stated is not the case), and the whole had been in one hundred shares, the holder of each one of these shares would have contributed at the present period £5540; he would be now actually receiving from the profitable mines the annual sum of £1356, but he would be called upon for the other mines in the year for £178 for his share of loss, and for £396 for capital for mines of which the works were not complete. These sums of

£178 and £396 being together £574, deducted from his profit, would leave a clear income of £782 for his advance of £5540, until by the completion of the necessary trials on the mines of the second and third class, and the abandonment of those of the fourth class, his share of capital would have increased according to my estimate to £5680, and his income might be expected to be £1400 per annum, or, as I have before stated it, about twenty-four per cent. on his advances. He might, however, in many instances have contributed for a time without the receipt of interest at all, and therefore an allowance in addition to the amount of capital must be made for this, although it is impossible to estimate it accurately from the diversity of circumstances, some mines having paid largely in very short periods, and others having required advances for a long time.

The case I have put of a person having an equal and original share in all, I know does not exist, as the shares have seldom gone on in a large proportion in the hands of the first subscribers, and many circumstances conspire to make them change their possessors at dif-

ferent rates of premium or discount ; but the supposition is a very possible one, and is convenient for the purpose of illustration.

I could extend the account by the addition of some other mines which are under my direction, but as they are for the most part the property of individuals, and unconnected with the others, and as I believe that though they would swell the sums, they would not much alter the general result, I omit to notice them.

If I am right in these statements, and have not indulged in any fallacy, (to which I respectfully invite your inquiry), I think I have made it appear that mining is, upon a large scale, sufficiently profitable to compensate the risk with which it is attended ; at least I presume it will be thought that the interest is much greater than can be otherwise obtained on large amounts with moderate risk, and equivalent, therefore, to any reasonable expectation.

If this is admitted to be the case in England, I proceed to inquire whether the same results may be looked for in Mexico, where the Company of Adventurers, of which you

are the chairman, are making such spirited efforts, and in the management of whose affairs so much has been confided to me.

Can we make a good selection of mines to which to apply our means and our exertions?

Can those exertions be directed with the same skill and effect as at home?

As there are evidently greater difficulties to encounter, and a greater scale of expense to undertake, are there compensating circumstances to counterbalance or outweigh these disadvantages?

To the first question I would reply, that we had at the outset, and before one of our agents had set his foot in Mexico, good and sufficient evidence, that the number of mines was greater there than in any part of the world; that they had been uncommonly productive, and very profitable under many discouraging circumstances; that they were like other mines, attended with differences in natural advantages, as well as in value of produce; and therefore it was evident enough that a good choice could be made, or such an one as would ensure every fair chance of success. Since our agents have been esta-

blished there, and with the experience of many months, this evidence has been strengthened ; many doubts have been cleared up, plans and descriptions have been laid before us, and we also have had the *viva voce* opinion, on a number of particulars, of a very respectable mining agent, who has returned, all concurring, as I venture to assert, not only to prove that a good choice may be made, but, as far as judgement in these matters goes, that a good selection has been actually made for us.

Where such a variety of mines exist it must indeed be admitted that many of every description are to be found ; and, if we could now analyze the former accounts of profit and loss, no doubt we should find it so ; there is, however, very good reason to conclude, that among the best were many instances of a rate of profit far beyond any that the most productive mines of the inferior metals could possibly exhibit.

A selection of profitable mines in Mexico ought to be much easier than in England ; not only is the number to choose from so much greater, but, owing to the political cir-

cumstances of the country, they were for the most part unoccupied, or in the hands of persons disposed to part with them. All the indications upon which a miner would form his judgement are as perfect there as any where else; the historical account of produce and profits have been, in many instances, well preserved; the causes for their abandonment can be easily understood; the veins are numerous, large, and distinctly characterized; and the face of the country often is favourable to mining observations.

All this was evident enough from the testimony of M. Humboldt, but has been rendered more clear and apparent by the observations and reports of our English miners. Among the mines in England which are included in those which furnish the accounts herein stated, some have been greatly profitable upon a small expenditure; some have required a great outlay, and have also been profitable in a fair proportion to that outlay; some have after much cost produced a return not adequate to the capital employed, and others have been attended with irrecoverable loss. This of course will be the case in Mexico, or any

other mining country, and profit will depend there, as here, on judicious selection and on proper management.

This selection being made, can our means and exertions be as well applied there as at home?

No reasonable doubt can be entertained on this question, unless upon the broad ground that the management of affairs cannot safely be deputed to agents; in reply to this, I would merely remark that not only in mining, but in all cases where very large capital is employed, the management is and must be deputed, from the necessity that exists that it should be so.

No individual eye can follow all the detail, nor any individual mind embrace all the considerations necessary to render perfect the numerous and varied arrangements that are required. In all such matters a division of labour, as well as of skill, must be employed, and the energy of the controlling power, let it rest where it may, will be better directed in judging of the capacity of those employed in different departments, in combining their efforts to attain a given object, and in esta-

blishing checks and encouragements, than in entering into a labyrinth of minute circumstances, which would only cloud and perplex a clear insight into the main purpose.

Let the controlling power rest in one or more persons, it is certainly essential that by one or more a knowledge of matters of detail should be possessed, but the principal use of it will be to form a correct judgement of the skill, industry, or integrity of those to whom the duty of execution is deputed.

I venture to think that whoever will look into the mode of conducting mines in England will find this system exemplified, and that they will find among those who conduct the various operations of these great works an unusual share of talent, zeal, and those other good qualities which are essential to command respect and confidence. I have abundant reason to be grateful to numerous excellent persons, without whose knowledge and exertion I could have done nothing; others who have taken the same pains to find such and to encourage their talents and assiduity have the same reason to be satisfied, and no very good reason occurs to me why

the same means may not be employed abroad as well as at home. It may be more or less difficult at first to find suitable agents, because all have not the same means of making choice, because the change of station and of country sometimes works alteration in the habits of some, and because new manners and unforeseen difficulties for a time are embarrassing to most. But I look upon these obstacles to be temporary, and they are to be counteracted by the judgement and patience of those who may be the appointed leaders of the enterprize abroad. Mines in England are dispersed over distant parts, and are therefore remote from each other, and from the constant observation of those who possess them; but they are nevertheless skilfully and honestly conducted; and if there are cases of delusive or improper management, they are most commonly to be attributed to want of caution or judgement in the deputation of the necessary authority, and are not to be taken as facts upon which to establish any material conclusion.

If mining cannot be properly managed in a distant country, it ought to follow that

neither can any other business be carried on out of sight of the principals, and much of our foreign trade and concerns ought to be abandoned. But in fact there are circumstances in favour of mining in this respect; the Agents usually employed are brought up to a system of deputed authority, their habits are formed to it, their emulation is excited by it, and their hopes depend upon its right application. No one that I know of refuses to send a ship to sea, because he cannot go and command her himself, or take the helm, and keep the reckoning; on the contrary the capital is provided by one person, the science of direction by another, and skill in the detail of subordinate matters by others, all combining under good arrangements to a profitable end.

Upon general reasoning of this sort, I should then decide that mining can be properly conducted abroad; but as one to whom you would have a right to put the question, whether, in my experience of such matters, I seriously believe that persons are employed or can be employed, who will execute the trust reposed in them with credit to them-

selves and advantage to their employers ; I answer that I am decidedly of this opinion, and I may also add, that you, and others who have paid attention to what has been already done, have had ample testimony as to the value of the efforts that have been made.

Upon the last and most important question, whether, as the expense, difficulties, and risk must be greater, are there compensating circumstances to counterbalance those disadvantages, and to conduce to a profitable result, I have thought seriously and anxiously, and I need not now say, that my opinion has also long since been and is now in the affirmative, and that I expect profits equivalent to all reasonable expectation.

I cannot now go into all the grounds of my reasoning on this subject, which might be tedious and difficult to state. I have read what has been published by others respecting the prudence of undertaking mines in these new countries, and I agree with a good deal that has been stated, though these statements have not always been guided by sufficient knowledge of the subject, and in particular with

the circumstances which render mines profitable or otherwise. Some have advocated the advantages of steam and other machinery, some have dwelt on the former produce, and others have adduced the want of skill formerly employed. These are all entitled to their due weight, but there are many other considerations to be taken into account.

I can hardly be expected to describe now all the details of management which must be applied to obtain profit, to show how, also, what is right to be done in one instance is to be avoided or modified in another; but I may mention examples drawn from the mines of which I have taken the accounts, to prove that the proper application of management is essential, and that great produce is not always attended with profit. One of the mines in Class 1 has been working fifteen or sixteen years, and produced in that time more than £300,000 value in copper and tin ores, and yet the working was attended with constant and considerable loss. It was purchased two years since by the present proprietors, in its losing state, for £10,000, since which time the sum of £32,000 has been expended

upon it; it has now become profitable, and has every appearance of becoming a lasting and prosperous concern.

Another and the most important mine in our list was abandoned twenty years ago, by a manager, then of great reputation, acting under Adventurers well acquainted with mining, and generally successfully engaged in it. The works were re-established about six years ago, at an expense of £65,000, and they are now very profitable, and likely to continue so, and to improve.

Now, in these cases, the alteration has not been owing to the mere application of machinery, because that had been employed before; but it has been owing to many lesser circumstances, in which improvement has taken place in the progress of mining experience. We have many cases in England of old and abandoned mines re-opened with advantage, and by various persons or companies; and why should it not be thus also in Mexico?—It is not necessary to show that there was great want of skill formerly, but whatever it might have been, it cannot have improved in the last twenty years, in the

midst of war and civil commotion which stopped the Mexican mines.

The skill of the English Miners, and more particularly what may be called the economy of mining, has made rapid progress in the interval. If this improvement can make mines formerly abandoned profitable in this country, may it not produce equal or greater effects in a region abounding with ores, of which the value is to any English ore as four to one, and the quantity from any given extent of mining ground greater also than can be found here.

Estimates on the costs of mines are always, from the nature of the thing, very uncertain; and estimates of profits, which include additional uncertainties, are of course much more so, and ought always to be given and received with caution, and due allowance made for the difficulties in coming to any just conclusion. But to form any opinion at all that is worth any thing, a process of this sort must be had recourse to; it may indeed, when done, amount only to probability; but the chance or risk is adherent to the undertaking contemplated, and is indeed connected

with the higher rate of profit which is often obtained.

Let us first examine in what the expenses of working mines consist, after the first out-lay has been made, and which out-lay will most evidently be three or four times as much in Mexico as would be required in England, on account of the expense of the transport of machinery, materials, and workmen. After this is stated, I think it probable that the current costs will not differ so greatly as many have imagined.

Supposing an English mine to require £4000 monthly to meet the expenditure, where the ores raised are sufficient to give fair profit, and that such a mine is drained by steam power, I should be inclined to class the expenditure into proportions somewhat like the following :

Underground labour	2000
Surface labour	200
Artizans ditto	200
Materials	700
Engines, fuel, labour, &c.	500
Carriage and sundries	250
Agents	150
	<hr/>
	£4000

How are these different heads of expense likely to stand in Mexico, from what we at present know of the country?—all will probably be higher than in England, but in very different degrees.

1. Labour of Miners in Mexico is paid for very variously in different districts; at Real del Monte the best miners are content with half a dollar per day; this rate is lower than in England, but nominal wages are not a criterion of the real cost of labour, and if men are unskilful or indolent their work may be dear though their daily wages are low.

I am inclined however to think tolerably well of the mode of working of the Mexican Miners, particularly from the information given me by Captain Rule since his return, and I venture to think we need not add much on this head, as though some English Miners are to be reckoned at high salaries, their number will be few, and the industry of the whole will be stimulated and improved by working on contract, which may be easily introduced. I will suppose however underground labour to cost 10 per cent. more than in England

2. I know of no reason for making any addition to the charge for surface labour.

3. Artizans, in which I include engineers, carpenters, smiths, masons, &c., will at present cost three times as much as in England, but if the mines are established, will after a time be supplied even from this country at a lower rate than at present.

4. The materials used in mines are principally timber, cordage, iron and steel, gunpowder, candles, leather, &c.

Of these some leading articles are actually supplied (at Real del Monte for instance) at much less than in England, others, although produced in the country, are dearer, and iron and steel will cost four or five times as much as here, including the carriage; we may perhaps, considering the machinery, add 50 per cent. on this head.

5. The expense of engines applied for draining, where they shall be necessary, consists, after the expense of erection, principally in fuel and attendance, repairs coming indeed under the head of artizans' labour. Now there is no reason to expect that fuel, in well selected situations (and in these only will en-

gines be used), will be so dear as in Cornwall. At Real del Monte a *carga* (300lbs.) of wood costs at the mines a *real* or $6\frac{1}{2}d.$, taking this to be equal only to a bushel of coal weighing 80lbs., the cost of the latter at the mines in Cornwall is at least $10d.$ At Bolaños timber is also abundant, but water power which costs nothing may be applied, and also at Oztumatlan, while at Zacatecas the mines are nearly dry. I see no reason to expect that the current cost of engines will be higher than in England.

6. Carriage, when roads are improved, which will soon be done in the immediate vicinity of the mines, will be much cheaper than in England. I have allowed for transport of materials from the coast under that head. Sundries may include many articles which cannot be exactly contemplated, some of which will be dear. I will therefore double the charge under this head.

7. Agency will of course be high; I estimate it at four times what is required here.

Estimating in this manner the expenditure of a mine in Mexico, the additions I have

proposed would make the £4000 to be increased to £5630, but it may be safer to take it at £6000, or an addition of 50 per cent. on the whole. Another point of great importance to be considered in connexion with the disbursements of mining, is the payment made to the proprietor of the mine or the soil; and I am glad to do this, as, from what I have often heard remarked, I believe that considerable misapprehension exists upon this part of the subject, and that many have conceived that the proportion paid to the Mexican proprietor is enormous compared with what is paid in England. I am certainly not of this opinion, nor is any person conversant in this matter with whom I have discussed the question. First, I may premise that as the cost of raising and getting poor ore, or a cheap metal, is almost the same as for an equal quantity of a rich ore or a precious metal, so the proprietor in whose land the latter is found will of course expect and receive more than the proprietor whose estate only produces the former, leaving the profit of the Miner in some measure equalized by this generally admitted arrangement. This

is a reason why silver may be expected to pay more to the Proprietor than the inferior metals.

In my account of the produce of our English mines I have taken the net value of the ores after the dues to the lord are paid or allowed for. Now these dues or the lord's part in England is always some proportion of the gross produce of the mine, and is paid whether the mine is a profitable or a losing one; it is common to pay from a twenty-fourth to a tenth of the gross value, and there are parts of England producing ores rich in lead at lower charge than common, which even pay one fifth. As however the deep mines of Cornwall, which by reason of their heavy costs pay the lowest rate of dues, make a considerable part of my account of produce, I estimate our dues at 7 per cent., which amounts on our return to about £40,000 a year. The proprietor in England receives this also without making any allowance towards the outlay in putting the mines to work and repays nothing in the event of loss.

In Mexico, the agreements with which I am acquainted give to the proprietor, as the

highest rate, one moiety of the clear profit, and in several later agreements only one third; in all these cases he agrees that the adventurers shall deduct the full amount of outlay from the profit, before it is divided, the adventurers allowing the deduction to be made gradually.

Now if we take our present balance of adventurer's profit in favour of the whole, including the losing mines at £60,000, and we were to add the £40,000 now paid to the lords and divide the £100,000 between us, we should be better off than we are, if the lords would join us in liquidating the capital as they do in Mexico.

If, as I hope, our profits should increase as I have stated to £140,000, the lord's dues would increase also, say to £60,000; they would indeed then receive but 30 per cent. of the profit, but as I have mentioned many agreements give to the Mexican proprietor but 33 per cent. and they join in repaying the capital: What I consider however very important is, that here losing mines pay perhaps a large amount of dues, while in Mexico they would at any rate pay nothing, or no

more than may be lent in the way of *alimento*.

It does not appear to me, from considerations like the foregoing, then, that the expense of mining in Mexico is so much greater than in England, as to be a serious obstacle to its prosecution. The difficulties that I have yet heard of, after more than twelve months correspondence with competent agents on the spot, are not in my opinion formidable; and the risk is much the same, or, as I believe, less than in most mining districts. In making this remark I confine myself to mining risks, always excepting political ones, regarding which I am not so good a judge as many who are concerned in these undertakings, and the consideration of which I always wished to leave to those who embarked in them.

I shall now proceed to state what are in my opinion the circumstances attendant on these mines, which may compensate for extra charge and greater difficulty; and which encourage me to hope for a much higher rate of profit from mines, well selected and judiciously managed, in Mexico than from those of England.

The leading consideration with me certainly is the very much higher value of a given quantity of the mineral produced; with this I connect the established fact of greater width or size of the veins, and the extent on one or more of them that may be explored in certain districts, and I take as collateral evidence of large profits, the known results of former workings, which indicate that what may be calculated upon has been realized in former times. We have as yet no very good statements as to the average value of the Mexican ores: when M. Humboldt states that they are poor in silver, but very abundant in quantity, he speaks not of ores dressed and washed as we always suppose ore to be in England but he describes the whole mass as broken from the vein. The operations of dressing, properly applied, will reduce the quantity and concentrate the value in a smaller bulk. Thus, if we were speaking of tin ores here, and were to value the whole mass as raised from under-ground, we should commonly find the tin stuff, as it is called, not to hold more than about 3 per cent. of metal, and consequently worth nothing to smelt. But by the applica-

tion of various processes of washing, the bulk is reduced in the proportion of twenty to one, and the dressed ore is rendered worth from 60 to 70 per cent. Copper ores, as they are broken from the mines, and including the whole, rich and poor together, do not average more than 2 per cent. metal, but by selection and dressing the bulk is reduced from 4 to 1, and the dressed ore is thus made 8 per cent. in which state it is smelted.

But the value of metallic silver is to copper or tin fully as 60 to 1, and we, therefore, do not require either such a reduction in quantity of the ores, or such elaborate processes as are employed in tin dressing, to render the merchantable ore of far higher value than copper ores, to which I would compare it, as its admixture with the matrix or vein stuff is more analogous to those than to others, and the dressing processes would be probably more similar. We know that they neglected to work formerly, in the Biscaina veins at Real del Monte, all ores which did not produce twenty-four ounces per ton, always reckoning upon the whole mass of the lode. We know that the ores at Bolaños contained more than three

hundred ounces per ton. The latter is one of the richest mines, and the former by no means one of the lowest in produce or per centage. We may, therefore, probably estimate the produce of the mass, on an average of well selected parts of the mines, at sixty ounces per ton; now if this value is concentrated by dressing, as in the case of copper ores, and the bulk reduced from four to one, we should have the ores containing two hundred and forty ounces per ton, and valuing the silver only at three shillings per ounce to allow for expense of smelting, &c. worth £36 per ton. Copper ore, at the present high rate, is not worth on the average £9, but we may take the proportion as four to one. But the relative value of the ores must be compounded in calculating the returns of a mine with the quantity likely to be obtained; now, on this head, all the evidence goes to prove that the produce of the Mexican mines has been most abundant.

The quantity raised from a mine is in proportion to the number of veins explored and drained by any set of works, to the width or size of those veins, and to the degree or ex-

tent to which they are enriched, all veins having their greater part poor and unproductive.

I know of no mining fields that exhibit so many veins which can be worked together as some of which I have plans and authenticated accounts from Mexico, and M. Humboldt's accounts of the extraordinary width of the veins are verified by the observation of English miners : the degree of enrichment is much the same as far as I can judge as in other countries, and always in all a matter of uncertainty. But taking the width of the veins only, we shall find them commonly from four to eight feet in width, while in England I should take as the average width of good veins or lodes two to three feet.

Now the result of the compounding the differences of value and quantity would be, that in England a fathom in a vein would produce about twelve tons of stuff, which, being dressed, would yield three tons, worth £24; and a fathom in a vein in Mexico would produce twenty-four tons of stuff, which, when dressed in the same manner, would give six tons of ore, worth £216.

That is to say, the produce of the one mine would be to the other as nine to one.

I have estimated the expense of working as one and a half to one, and the advantages in favour of the silver mines would therefore be as six to one; and though this may appear, as it perhaps does, too much to calculate upon, if we consider the profits on English mining, yet, as I am not aware of any particular fallacy in which I have indulged, and as I have already said that a larger capital may be necessary, I will merely take it to prove at least that there are circumstances in these undertakings which may compensate for extra expense, difficulty, and risk.

The collateral evidence to support the probability of such expectations is to be derived from the great amounts of profit formerly acquired, and the statements of the proportion of costs in working mines to the actual amount of value of the returns. Many particulars of this kind are before the public, and particularly in the works of the Baron Humboldt: they have, I know, excited the ridicule of some, and have been treated seriously by others as exaggerations brought forth to tempt

the unwary. I apprehend, however, with proper deference to the wit of the one, and to the due caution of the others, that the fact of enormous profit in many cases rests upon very good evidence ; and supposing that there were also very numerous cases of loss, which is admitted, that will only prove, what I am all along ready to admit, that mining to be profitable must be attended with skill and care in choosing and conducting the undertakings.

My inference from the whole is, that mining is neither, as the public seemed to think a few months since, a certain source of immeasurable wealth, to be obtained by every one who was lucky enough to get a share in any mine, in any place, and under any kind of management, nor is mining, as it seems now the fashion to designate it, all a bubble, cheat, and delusion. I maintain that British capital may be applied to it with the fair chance of competent profit, if the means properly adapted to the end be used and steadily continued. Money, time, and patience must be allowed to it; and, however public opinion may vacillate, fluctuating counsel in those who have to sup-

ply these requisites, may perhaps really be the source of the danger most seriously to be apprehended.

If the profit is, as I think, likely to be large, it may be asked, why limit the capital to be employed, and why not engage an amount as large as possible. I only notice this because I think this suggestion might lead to an imprudent investment, and because I thought some time since that there was some danger of too much money being turned into this channel. Perhaps, also, now there may be risk in the other extreme, and that the proper allotment of capital to ensure success may with difficulty be obtained.

The proper limitation of capital will in my opinion in Mexico be, to that amount of which the application can be effectively and judiciously directed. In England I doubt at present whether there are many mines worth working, at the prices the metals now yield, which are not occupied in some way or other, and therefore a further investment of much capital is not required, or not to any great extent. In Mexico, the number of unoccupied mines is still very great, but though

that is the case, it is not capital alone that will work them. A great quantity of skill, experience, and of labour also is required, and therefore, as the number both of able managers and experienced workmen is limited, so must be the extent of prudent enterprise. I am not therefore for attempting more than we can accomplish well, and I am desirous of seeing the experiment conducted upon that respectable scale which may lead to a worthy and profitable result, and not to endanger it by a division of force, or complexity of arrangements.

There is one subject more upon which I shall very slightly touch, because it is often mentioned as an objection to these undertakings, which is, that the quantity of silver produced may be so large as to depreciate the value, and so diminish the profit. If the quantity should be so large, so much the better I venture to think for the first adventurers, they must then indeed be sure of enormous profit in a short time, and need care but little what is to happen afterwards. Such an inundation of silver as should alter its value throughout the world implies a measure of success sur-

passing the wildest dreams of the most sanguine adventurers.

But this is speaking without much attention to facts; in mining, a constant investment of capital seems necessary to keep up the supply of the metals. We have frequently been told we should over-stock the market with copper in England; much of the capital I have stated to be employed has been applied by myself and friends in the last ten years to copper mines, others have been doing the same, the supply has somewhat increased, but not greatly, as old mines have been in the mean time given up, and the price of the metal has kept up and increased.

The mint of Mexico coined 30,000,000 dollars a year before the revolutionary war, it has since, at one time, produced but six or eight millions, and may now again have advanced to ten or twelve millions. It will require, therefore, a great deal yet to be done to restore the supply to what it was sixteen years ago, and it appears to me very probable that, in the general increase of wealth, the demand will go on to improve.

We have seen in England that the gross

value of the metals produced from a series of mines is nearly equal annually to the amount of the capital invested in working them; let this be supposed to be the case in silver mining, and if the Real del Monte Company, and the other Companies connected with it, should lay out £800,000 in Mexico, we might then expect a gross return of 4,000,000 dollars, and this amount would nearly agree with what I am led to calculate on, from various statements before me of the former produce of the mines; now as 20,000,000 dollars are required to bring the coinage of the Mexican mint to what it was in 1809, it would in this way appear that other companies or other adventurers must contribute £3,200,000 capital in addition to ours, to render this probable.

I have now stated the grounds which have influenced me to recommend to my friends these undertakings, and to engage in them myself; I am conscious that I may very imperfectly arrange the materials which are in my hands, and that the reasoning upon them would be much better managed by abler persons; but, although I could only complete

what I have done in the short intervals which a long journey has afforded, I yet was desirous, with whatever defects it might be attended, to lay before you data, on which alone I venture to think some judgement may be formed.

In conclusion, I would ask to what is to be attributed the extraordinary fluctuation in public opinion ;—does it appear that the eager demand for mining shares a little while since, and the rejection of them at present, has been owing to any just appreciation of adventures of this sort, or did that, in fact, make any part of the calculation ? As far as I have observed, I am inclined to apprehend that too many people engaged in schemes of all kinds, not with any consideration of what the undertaking was likely to produce, not with an intention of contributing their share of the capital, but as a game on the price of shares, and for the chance of premiums.

Many schemes perhaps have been found to be, at least, of unpromising character ; calls for money which had never been thought of came to be paid ; the well-founded and the imprudent plans are confounded together ; shares

are pressed into the market where few buyers are to be found, and general alarm and want of confidence ensues.

It is the fair and reasonable duty, in such a state of things, for those concerned in any undertakings that may suffer by it, to explain fully and candidly the nature and expectations of their enterprise, and a desire to do this to the best of my power has led me to trouble you with this long letter at this time.

I am, dear Sir,

Your's, very faithfully,

JOHN TAYLOR.

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